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THE SURPLUS GAINS OF LABOR.

In a recent number of the *ANNALS* I expressed my appreciation of the recent and valuable monograph of Professor Patten entitled *The Theory of Dynamic Economics*. Predicting that this work, when completed, will be an epoch-making one, I dissented from one of its statements, which asserts that a laborer realizes a surplus gain from the last labor performed in a natural working day. A true surplus seems to me to be a net accession of well-being in consequence of all the effects of this final labor. The work of the last quarter of an hour benefits the man through the things that he can buy with the wages then earned. It injures him, first, by the weariness that it entails, and secondly, by the confinement that it involves. It deprives the man, first, of so much nervous and muscular tissue, which is a physical loss, and, secondly, of so much pleasure that he might otherwise have had from walking, conversing with friends, playing games, fishing, gardening, reading, etc. It trenches on enjoyments that cost nothing and require only time.

In considering whether there is a surplus of benefit realized from working through the last fifteen-minute period of the day, one must take account of one plus quantity and of two minus quantities. The whole benefit comes from the articles bought with the wages of the final period; while the injury is the sum of two sacrifices, of which one is caused by weariness and the other by confinement. If the plus quantity exceeds the sum of the two minus quantities there is a surplus gain realized; if it falls short of equaling this sum, there is a loss, and if it just equals it, there is neither a gain nor a loss from the work of the terminal period.

In making the computation in an arithmetical way it is possible to add the two negative quantities together as a subtrahend, and deduct them from the positive figure that

represents gain ; or we can subtract from the figure representing gain, first, the quantity representing sacrifice entailed by confinement, and compare the remainder so secured with the figure representing the sacrifice entailed by weariness. Confinement means a loss of free utilities. Estimate this loss numerically, and deduct it from the figure representing the utility of the earnings of the final period, and you have the net gain of the final labor. Subtract from this the amount representing the direct disutility of labor, and the remainder, if there is one, is a surplus.

This amounts to saying that the figures representing deductions from well-being may be added, and the sum may be subtracted from the amount representing the gross increase of well-being, or the two deductions may be made successively. If the object be simply to test the existence of a surplus at the terminal point of labor, it makes no difference which process we adopt.

If there are incidental objects to be secured, one method or the other may have a preference. If we wish to get all the utilities, free or otherwise, realized in an entire day into one sum and compare this with the positive pain inflicted by the entire labor of the day, the second of the two processes would be the one to adopt. If we wish to make the simplest possible test of the net effects of the terminal labor, the first method would be the one to take. Gain is so much ; losses by confinement and by pain from work amount to so much ; which sum is the greater?

It has seemed to me that the term *cost* is well adapted to express all deductions from well-being entailed by getting a useful thing. In popular speech, we defray the cost of buying a thing when we take money from our pockets ; and the money stands for utilities. We pass potential enjoyments over the counter and get a particular enjoyment by the means. We do not inflict on ourselves a positive pain. The loss of free utilities entailed by confinement, and by the pain inflicted by labor, seem both to be deductions from well-being ; but the former of the two seems to me to be more

nearly of the kind usually indicated by the word cost. It is not, however, this point in terminology, discussed by Professor Patten in his recent reply to my criticism,* that I wish most to have decided, but a point of fact. Is there a surplus of gain realized from terminal labor? I cannot see that there is. A man does not voluntarily stop working when he can gain more than he loses by going on.

In the monograph referred to, I understood Professor Patten as meaning that there is a surplus of gain from final labor above the cost represented by the labor itself, and that this surplus is equal to the gratifications lost by confinement; so that, if this loss be first deducted from the direct gains secured by terminal labor, these will be reduced to a point at which they will constitute a bare offset for that labor. The net surplus will vanish. "There is for the efficient workmen," says Professor Patten, "a surplus at the margin of production equal to the pleasure that could be obtained in using their time in unproductive consumption."[†] This looks as if they could have had as much pleasure as their surplus gain amounts to without working at all. The loss of the free gratifications offsets those that are secured by work and are not neutralized by the fatigue of the work.

From his paper in the *ANNALS* for January, 1893, I now understand that Professor Patten takes due account of the loss of free pleasures entailed by confinement, and finds that, in spite of it, there is a true surplus gain realized at the margin of production. The former of the two arithmetical modes of testing the existence of the surplus should not, as he thinks, be adopted. The free pleasures that are lost by confinement should first be estimated and deducted from the sum representing the pleasure derived from articles procured by the terminal labor of the day. The remainder will still yield an excess of gain over the sacrifice directly involved by the fatigue of labor. I quote from this paper:

* See the paper on "Cost and Utility," in the *ANNALS* for January, 1893.

† Theory of Dynamic Economics, p. 71

"To make the problem definite, I shall use some tables representing the utility and the cost of the various articles :

	I.	II.	III.			
	Utility.	Cost.	Utility.	Cost.	Utility.	Cost.
A,	. . . 8	1	8	1	8	1
B,	. . . 7	2	7	2	7	2
C,	. . . 6	3	6	3	6	3
D,	. . . 5	4	5	7	2	4

"In the first table, let the utility and cost be represented as they would be if there were no loss in consumption resulting from the extra hour's work. We will suppose that the utility derived from the consumption of the first three articles will be reduced three units if the work is extended through the tenth hour. Then, if I understand Professor Clark correctly, he would estimate the utility and the cost of the articles as in the second table. The diminution of the utility of the first three articles is a cost, he says, and this cost added to the pain of producing D would make its total cost seven units, thus preventing its production. I would, however, estimate the utility and the cost according to the third table. Under the conditions assumed, the joint utility of A, B and C, if D is not produced, is twenty-one units. If D is produced, the joint utility of the four articles is twenty-three units. The utility of D under these conditions is therefore but two units. If the workman works ten hours, the tenth hour adds two units to his stock of utilities and his cost is four units; *therefore he will not work the extra hour.*" The italics are mine.

I accept the arithmetic as sound and agree with the conclusion that the loss of free pleasures, taken in connection with the pain inflicted by labor itself, has the power to bring work to a stop. In my view it will do this under normal conditions, not at the end of the ninth hour, but at the later point, where the pain directly inflicted by labor just offsets the net gain in utility secured by that labor. In locating the point in this way we use a notation of the kind indicated in

Table No. 3. Again, the stopping point will be reached when the total deduction from well-being entailed by final labor equals the gross gain secured by that labor. In locating the point by this method we proceed according to the mode of calculation shown in Table No. 2. By either test there will be, as I continue to think, a point of equilibrium; and in the case described it could be located somewhere between the end of the ninth hour and the end of the tenth. Through the earlier part of the tenth hour the man is realizing a true surplus; if he works through the latter part, he experiences a loss. A point exists where there is neither surplus nor loss, and this fact may, as it seems to me, be revealed as well by the one notation as the other.

Let us put ourselves in the worker's place. It is now five o'clock in the afternoon and, according to the conditions assumed in Professor Patten's table, the sacrifice entailed by confinement has not yet made itself felt. By six o'clock confinement will have cost the man three units of free pleasure, and the labor itself will have inflicted four units of pain. The subjective value of the article procured by working till six o'clock is five units, thus affording an excess of only two units of net gain; and as the direct pain of working has a negative value of five units, the man does not do the entire hour's work.

Will he do a part of it? The loss entailed by confinement cannot come upon him all at once, as he enters on the tenth hour spent in the shop. According to the principles on which the entire theory is based the gain that can be made by working through a third of the tenth hour is slightly more than a third of the five units of the table. The articles procured by the earnings of successive periods of equal length are of continually diminishing utility. We will say that the man can, in one-third of an hour, earn something worth one and five-sixths units. The loss of pleasure through confinement during this fractional hour is far less than a third of the three units. Confinement in-

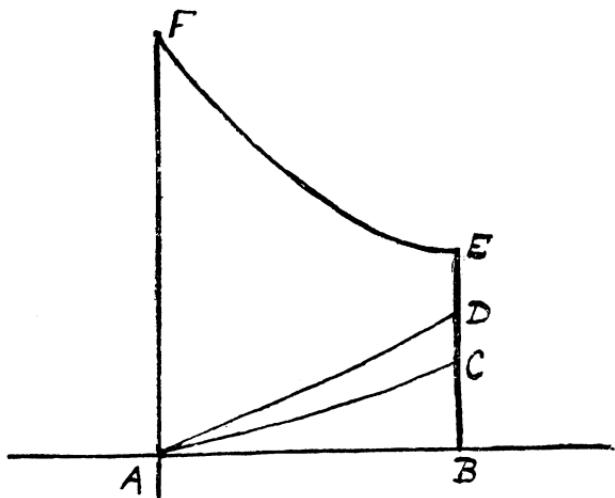
creases in burdensomeness as time advances, and costs very little when it first makes itself felt. We will call the loss from this source two-thirds of a unit. The pain of the labor of this third of an hour is less than a third of the four units of the table. We will estimate it at one and a sixth.

Utility of article procured,	$1\frac{5}{6}$
Utilities lost by confinement,	$\frac{2}{3}$
Net utility gained by this labor,	$1\frac{1}{6}$
Direct disutility of labor,	$1\frac{1}{6}$
Surplus of gain,	0

That the surplus vanishes at twenty minutes past five o'clock in the afternoon, and that the man naturally stops work at that point, may be shown by either of the two arithmetical processes suggested. We may add two-thirds to one and a sixth and subtract the sum from one and five-sixths. This is taking both varieties of what I have termed costs from the gross gain of the final period. It leaves no remainder. Again, we can deduct two-thirds from one and five-sixths, and from the remainder take one and one-sixth. This is first deducting from the gross gain the loss entailed by confinement, thus determining the net gain, and from this again deducting the amount representing the direct disutility of labor. This process also leaves no remainder. At twenty minutes past five o'clock the net benefit that the man gets from the labor then in process becomes *nil*.

This tabular statement can be varied in a way that will express my view without raising points with which Professor Patten will disagree. The loss by confinement comes mainly in the lessened enjoyment of perfectly free utilities. The man cannot walk, talk, gaze at scenery, meditate, etc., as much as he would like to do. It is not, therefore, an imperfect consumption of the fruits of labor that is the largest item to be considered. Figures can be added expressing the measure of the free utilities, and the loss by confinement can be expressed mainly by reducing them.

The point at which the sacrifice from confinement begins to make itself felt appears to me to be earlier than the end of the ninth hour. It varies with the nature of the work and with that of the worker. Labor calling for severe muscular or nervous strain may exhaust the man's energy early and release him from the shop at a point at which he has not severely felt the sacrifice from confinement. This, however, is the opposite of a typical case. Monotony, rather than strain, characterizes many kinds of work, and here confinement tells on the man, perhaps, as early as fatigue itself.



A full tabular representation of the facts would recognize the positive pleasure that sometimes comes from the earliest period of work. Sacrifice from exercise and from confinement is often a negative quantity for an hour or two. This fact, of course, has no bearing on the result of the final or marginal period; and it is that that we are studying.

A graphic representation may be made to express what seem to me the essential facts bearing on the present question.

Let measurement on the line A B represent time, and let vertical distance from that line to the descending curve, F E,

represent the utility of things procured in successive hours of work. Let vertical distance from the same base line to the ascending curve, A D, represent the sacrifice from fatigue, and let that from the base line to A C represent the sacrifice from confinement. The man will stop when the two sacrifices added together equal the gain secured. The terminal point of labor is where $B C + B D = B E$. This follows the method of calculation indicated in the second table of Professor Patten's article. Again, the man will stop when $B E$, the gross utility of the last thing bought, less $B C$, the sacrifice from confinement, equals $B D$, the sacrifice from fatigue. This statement follows the method used in Professor Patten's third table, and shows that the utility of the article last purchased is neutralized by the two sacrifices, as before. From my point of view, both methods are correct as means of testing the single question whether a surplus of gain is realized from the labor of the terminal period of the day. Both seem to answer this question in the negative.

Thanks are due to Professor Patten for helping to establish the true relation between land and other capital goods.* If interest represents a cost, rent does so; for saving money with which to buy land entails abstinence on the individual who does it, as truly as does any other saving. In connection with this point an important truth can, as it seems, be expressed by changing in another particular the table above referred to. Professor Patten supposes that the worker actually makes, in the successive periods of labor, the things that he himself consumes. He would have to make them by the aid of land and other capital, and a question would arise as to how, in the table, rent and other interest are provided for.

In the graphic representation above given it is assumed that the man is earning these things, but is not literally making them. He is earning money and buying what he will. In this way the smallest addition to his income can be

* Theory of Dynamic Economics, p. 55.

gauged in importance. An extra penny a day becomes an appreciable quantity after a week or two, and may be spent on something that will give an assignable degree of pleasure. The adjustment of gains to sacrifices can in this way be made more accurate than would be possible if it were necessary to use the supposed tenth hour for making some particular article that the man can in that period select and carry to completion.

This, however, is not the important consideration in the case. The whole relation of the two productive agents, namely, capital goods, including land, on the one hand, and labor, on the other, is involved in the notation selected. In our graphic representation nothing is said about rent and interest. This is because they constitute a part of the industrial product that does not need to come into view. The diagram above used recognizes only the earnings of labor itself, as the gain in the case, and not the whole output of the shop in which the labor is employed. If the work done is shoemaking, every shoe is the joint product of instruments, including land, on the one hand, and labor, on the other. A thesis that can be proved—though not in this article—is that wages are true earnings, under natural conditions. The normal wage of labor is the product specifically attributable to labor.

This involves a separating of a product created by men and instruments into two fractional parts, of which one is, in reality, produced by men alone, and the other by instruments. It involves, in short, a solution of the problem of *imputing productivity* to two unlike agents that co-operate in making the same thing. It is determining what fractional part of a shoe is due to land, building, engine, machines, raw material, etc., and what other fractional part is due to the activities of the men who use these instruments.

A stone is raised by a hand on a crow-bar; how much of the product is due to the hand and how much to the bar? A load of fish is secured by two men and a sail boat; how many of the fish are specifically attributable to the men and

how many to the boat? We cannot here say. Without an extended analysis we certainly cannot impute to labor and to capital the shares of the output of an industry that are severally due to them. If we could do this, and if we could further prove that the tendency of natural law is to give to each contributing agent the part that is due to its action, we could substitute in the diagram used product of labor for wages of labor. What a man gets as pay for the tenth working hour of the day is what he himself separately creates. In the entire diagram there is no need of any area representing rent or other interest. Labor creates the product there represented and gets it.

In this view it is easy to see whether rent and other items of interest are elements of cost or of surplus gain. Let us in imagination perform the operation of imputing utility to labor and to capital in the shoe factory. We will lay out the shoes in two heaps, of which the men are the virtual creators of the one, and the appliances used are the virtual creators of the other. To the men we will give the one heap as wages, and to the capitalists, including landlords, we will give the other as interest. Is either pile a surplus? One is the offset for one cost, and the other is an offset for another. There is a distinct sacrifice back of each gain in the case.

Is the pile that represents interest, including rent, a surplus from the worker's point of view? In the sense of being an excess, in the gross output of the mill, above the part that the man has contributed, it is so; but it is an excess that is brought into existence by the productive sacrifices of others. In like manner the wage earners' pile, from the point of view of the capitalist, is an excess in the gross output of the mill above the part that he has contributed; but it is an excess that is called into existence by the sacrifices of the laborer. If the whole output is created by these two classes of contributors, and is received by them as income, there is no objective surplus in the case.

The surpluses received by these producing agents appear to me to be subjective. In the case of the worker they seem

to be the personal gains from work during the earlier periods of the day. This may be termed *intra-marginal* labor, or labor performed before the equilibrium of gain and sacrifice is reached. In the case of the capitalist they are the gains from *intra-marginal* abstinence, or from that saving that takes place before the self-denial involved equals the gain that is thereby secured. I believe that every one of the valuable conclusions attained by Professor Patten in his recent work is consistent with this view.

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